

The Impact of Drought on Agriculture Sector in Loralai, District Balochistan:

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Abstract:

By nature, drought hazard is slow onset, and least understood of all natural disaster, exposed more agriculture, livelihood and societies than any other hazard in all over the world. Drought is defined as water scarcity low humidity or rainfall and less agriculture productivity has generally caused drought. The main purpose of this paper is to identify the impacts of drought on agriculture production in district loralai. Total 150 of the sample respondents were interviewed during field survey. Sample size was chosen on the basis of their respective population using propitiate allocation from each union council. Results revealed that, study area is highly affected by drought. People migrated to find out alternative sources of income generating activities. Mostly of the farmers were sold their assets and land to save their orchards affected by drought. The paper recommends the necessary mitigation measures (Water Reservoirs, Storage of water, low delta crops, farmers training and extension centers) to reduce the overall impacts of drought in the area.

Keywords: Balochistan, Drought, Socio-economic, Agriculture, Production, Loralai

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Introduction:

By nature, drought hazard is slow onset, and least understood of all natural disaster, exposed more agriculture, livelihood and societies than any other hazard in all over the world (Shahid & Behrawan, 2008). Drought is defined as water scarcity low humidity or rainfall and less agriculture productivity has generally caused drought (Hazards, Habiba, Shaw, & Risk, 2011). Drought can destroy the human lives, livelihoods, environments and damage to economy. Globe is severally affected by drought in the history, particularly after 19th century drought disrupted many lives and livelihoods. African countries including Soudan, Somalia, and California are severely affected by drought. Asia is considered as one of the most vulnerable continent in the world in the contest of natural disasters. Pakistan is the most affected country by natural hazard due to its geo climatic circumstances especially drought has a major role in it (Ainuddin & Routray, 2012a). Pakistan is a drought prone country and faced major droughts in the history (Idrees & Shah, 2009). Every year country faces one kind or another kind of any natural disasters like floods, earthquakes, landslides, coastal erosions, storm, cyclones and droughts affecting human lives, infrastructures, development activities and properties. Balochistan is one of the most affected Province of the country by drought (PDMA, 2014). In the current study only drought will be taken into consideration. Balochistan is highly vulnerable to disasters due to climate change, poverty, and lack of financial resources, poor infrastructure and weak institutional capacity (Ainuddin & Routray, 2012b). However, losses from drought are more than other natural hazard but drought has attracted less scientific attention than other hazards. The impacts of natural disasters and hazard are staggering globally. Pakistan is also working on natural disasters to reduce its impacts according to the global pattern. Global warming is the cause of a decrease rainfall in dry season and increase in monsoon season; result will be an extreme level of flood and drought (Wood, Burton, & Cutter, 2010). Province has already shown an increased frequency of drought due to low humidity and land use changes in last three decades especially in 1998-2003. (Ashraf & Routray, 2015). Therefore, for implementing necessary structural measures, drought impact identification is very fundamental to reduce its impact in the province. Drought impacts and vulnerability will be assessed on the basis of socio-economic and physical components. The overall province is highly affected by droughts, from last three decades especially the extreme drought was recorded from 1998 to 2002 (Ashraf & Routray, 2013). Drought highly affected the livelihoods, agriculture productions, populations, environments and economic sector of the

province (Ashraf et al., 2014). Climate change deforestation and industrialization are the main causes of global warming and drought. Consequently, study of the Past droughts can help in the description of those communities which are facing drought hazard. Loralai district is one of the most affected districts of the province. The current paper mainly focused the socioeconomic situation of the study area affected by drought. By nature, the study area is arid and semi-arid, due to which every year the area faces one kind or another kind of drought.

Literature Review:

In the literature drought is defined by various definitions as. The shortage of precipitation in a normal period of time is known as drought (Hang, Hubbard, & Wilhite, 2004). The climate dryness which decreases the soil moisture and the low level of water for sustaining the minimum requirements for plantation, economic system, animal and human being is called drought. Drought cannot be explained only by the shortage of rain but it is explained by its direct and indirect impacts on agriculture production, social and economic system (Hang et al., 2004). Drought is the combination of climate change and human vulnerability such as poor policies of the stakeholders, over usage of water, overgrazing, deforestation and lack of planning for water supplies and demand. (Aitsi-Selmi, Egawa, Sasaki, Wannous, & Murray, 2015) suggested that drought may be defined as a condition leading to decrease of utilizable water resources in a specific area to the amount that the community does not have sufficient access to water resources. For agriculture and other domestic purposes almost 1.5 billion people significantly depends on ground water assets (Alley et al., 2002).

Prior studies and assessments conducted in the country indicate that, the Balochistan province is highly affected by natural disasters like drought, flood and earthquakes specially in last three decades. “Generally Drought is a creeping phenomenon (Ã et al., 2008) and may have a number of economic, environmental and social impacts (BUIITEMS & UNDP, 2015).

Socio-Economic Impact of Drought:

The definition of socio economic drought is defined by the relationship of supply and demand of some economic goods with the interaction of hydrological drought, Agriculture drought and metrological drought (Kakar, Khair, Khan, & Khan, 2016). This type of drought varies from other types of drought because it completely depends on demand and supply process. Weather is the main responsible factor for the supply of agriculture

production, and economic goods such as food grains, water, fisheries and hydroelectric power. Due to Climate change some time water availability found to be insufficient to meet the basic requirements of human, agriculture and environmental needs (Hang et al., 2004).

Drought impacts can be assessed on the basis of socioeconomic, physical and institutional components (Cutter, 2008). Further each component has different set of sub components like education, health, quality of life, employments, sources of income, savings and social trust are the general variables of socio-economic component (Cutter, 2007). Dam reservoir, water channel, pond and drip irrigation system are the main variables of physical components in the context of drought. Policy implication, trainings, extension services and public awareness are the main variables of institutional components (Barkman, 2000. Cutter, 2010).

Methodology:

Loralai district is selected as the study area. "Geographically it lies between 67°41'18"- 69°44'22" East longitudes and 29°54'50"-30°41'28"North latitudes". On the basis of administrative units Loralai district is divided into four tehsils. Tehsil Bori is the most affected tehsil due to drought. Further three affected union-councils (Kuch Amaqzai, Lahore, and china Alizai) from tehsil Bori were selected for the said study. The study mainly based on qualitative and quantitative method techniques, and data collection was based on both the primary and secondary data sources. For primary data collection observation, household questionnaire survey and key informant's interviews were used. For data collection simple random sampling and proportionate sampling was used. Information related to the drought were also collected from the most effected union councils of the district. Whereas for the collection of secondary data journals articles, books, research papers and different government and non-government reports was studied to get information (PMD, 2011).

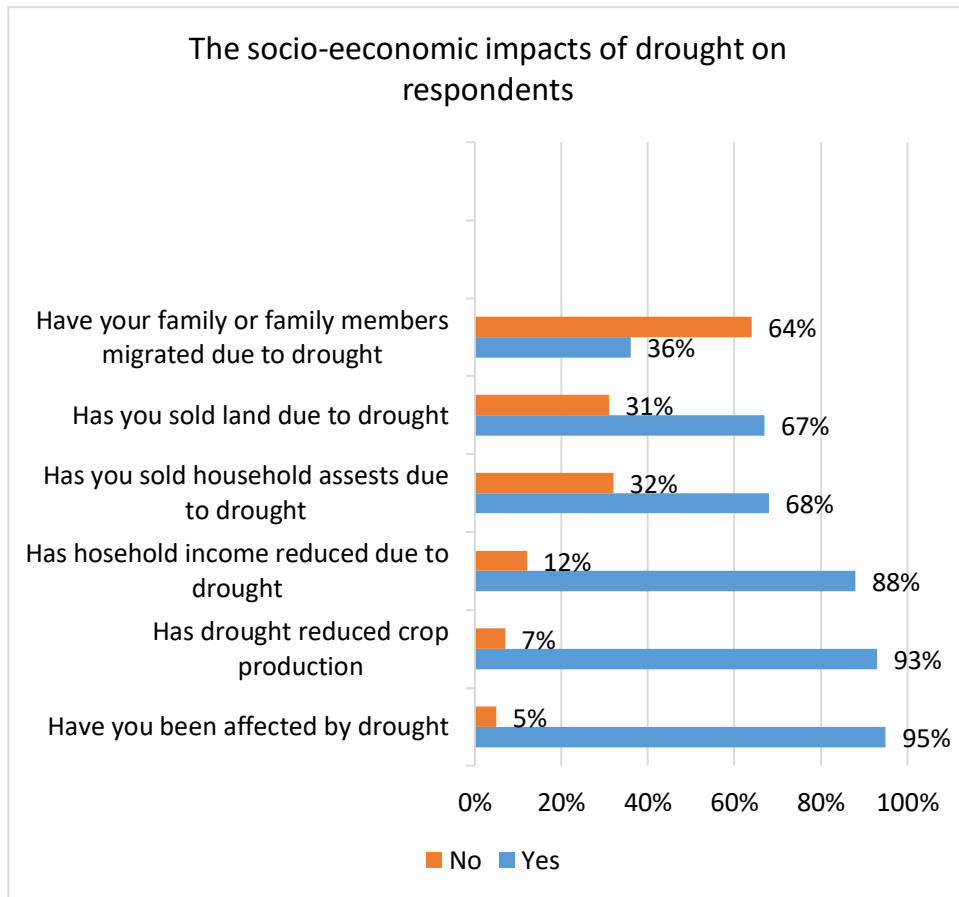


Figure 1 Study Area Map

Results and Discussion:

Drought Vulnerability:

The 1998-2002 droughts extremely affected the province's agriculture production, economy and people livelihoods of the rural areas. There has been extensive damage to dynamic potential of livestock and extinction of land. People dependency on agriculture production has increased the level of vulnerability in many districts of the province (Shaw, 2013).

Figure 2 The socio-economic impacts of drought on respondents

Agriculture production and livelihood of the people are closely interrelated to each other. Lower the agriculture production due to drought period in a particular area resulting to produce poverty and migration in rural areas. Respondents were asked about 7 indicators to know the socio-economic impacts of the drought as shown in figure 2 in the study area 36% people were migrated from their native place to find out alternative sources of economic activities. 67% respondents were sold their assets and land to save their farm lands. Economic activities were directly reduced as 88% of the respondents say that their household income have enormously reduced due to drought in the area. In the entire three union council crop production was highly reduced and 95% of the farmers were highly affected.

Impact of Drought on Agriculture Land and its Production:

Household farmers reported that, drought significantly reduced yields production and number of livestock. The lack of rainfall in the spring season significantly reduced the rain fed wheat and barley production about 42% lower than in normal year. During the drought period most of the barley and wheat production have consumed as a food supply. This has resulted in the shortage of seeds for the next crops.

Due to low level of precipitation more agriculture land has been affected in the study area. Crop production is the main source of people for food and their livelihoods. Reduced level of crop production is also resulting in the malnutrition of women and children.

Pre and post drought condition in the context of agriculture land have identified through following hypothesis.

Hypothesis testing 1

H₀: There is no impact of drought on reducing of agriculture land

H₁: drought reduced agriculture land

Alpha = 0.05

Critical Region: if p value is greater than alpha value H₀ will be accepted, otherwise elsewhere

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Area irrigated before drought in acre	12.33	150	10.885	.889
Area irrigated after drought in acre	7.21	150	7.764	.634

Here the given table shows a significant change in the irrigated area before and after a drought period. The average irrigated area was 12 acres per

household in the study area before drought condition. This average number has reduced down to 7 acres per household during drought period.

Paired Samples Test (outputs)

	Paired Differences					T	Df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
				Lower	Upper			
Area irrigated before drought in acre - Area irrigated after drought in acre	5.120	4.564	.373	4.384	5.856	13.739	149	.000

A hypothesis has made to know about the after and before situation of the drought in term of area. The results are statistically significant On the basis of the results of paired sample t test. As the p value is smaller than the alpha value. It means a significant change have seen in term of area due to drought. Study area have significantly affected by drought.

Impact of Drought on Livestock:

After agriculture, livestock was the second major occupation of the People in the study area. Livestock sector was also affected by drought.

Pre and post drought condition in the context of livestock have identified through following hypothesis.

Hypothesis testing 2

H₀: There is no impact of drought on reducing of agriculture land

H₁: drought reduced agriculture land

Alpha = 0.05

Critical Region: if p value is greater than alpha value H₀ will be accepted, otherwise elsewhere

Paired Sample T Test:

Hypothesis has made on the basis of paired sample t-test. The independent or paired sample t-test is a procedure or statistical tool used to decide, whether the average difference of the observations between two sets is zero. Each entity or subject in paired sample t test is measured twice resulting in pairs of two sets of observation. Paired sample t-test is commonly used to know about before and after situation of any entity or events. For the current study paired sample test is used to know whether drought affected the agriculture land and livestock in the study area. During field survey respondents were asked about their agriculture land in the form of irrigated area and number of livestock. Questions were asked for both before and after drought condition. Further results of the responses are compared through following paired sample t test.

Paired Samples Statistics:

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Number of livestock before drought	24.20	150	20.710	1.691
Number of livestock after drought	11.08	150	12.760	1.042

Here the given table shows a significant change in the number of livestock before and after a drought period. The average number of livestock was 24, per household in the study area before drought condition. This average number reduced down to 11 numbers of livestock per household during drought period.

Paired Samples Test (outputs)

	Paired Differences					T	Df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error	Lower	Upper	T	Df	Sig. (2-tailed)
Pair Number 1	13.120	13.173	1.076	10.995	15.245	12.199	149	.000
of livestock before drought - Number of livestock after drought								

A hypothesis has made to know about the before and after situation of the drought in term of livestock. The results are statistically significant On the basis of the results of paired sample t test. As the p value is smaller than the alpha value. It means a significant change have seen in term of livestock due to drought. Number of livestock have extremely affected due to drought.

Conclusion:

Pakistan has a history of frequent droughts and it will also be occurred in future. Therefore, it is important to design an integrated policy framework for drought risk management in the country. Such integrated strategies should cover as many features of the condition as possible. There is a need to give special attention to agriculture, health, education and modern technologies aspects to strengthen farmer's ability to cope with drought. By nature drought hazard is slow onset, and least understood of all natural disaster, exposed more agriculture, livelihood and societies than any other hazard in all over the world (Shahid & Behrawan, 2008). Drought is defined as water scarcity low humidity or rainfall and less agriculture productivity has generally caused drought (Hazards, Habiba, Shaw, & Risk, 2011). The main objective of the current paper was to assess the socio-economic impacts of drought in district Loralai. Three most affected tehsil were selected for the said study. Primary data was collected based on

questionnaire survey. Respondents were asked about 7 indicators to know the socio-economic impacts of the drought as shown in figure 5.1. in the study area 36% people were migrated from their native place to find out alternative sources of economic activities. 67% respondents were sold their assets and land to save their farm lands. Economic activities were directly reduced as 88% of the respondents say that their household income have enormously reduced due to drought in the area. In the entire three union council crop production was highly reduced and 95% of the farmers were highly affected. From the whole discussion as discussed in the dissertation, it is clear that the study area has adversely affected by drought. Especially the socio-economic condition and livelihoods of the people affected to a large extent. The low precipitation level resulted in affecting more agriculture in the study area. Crop production was the main source of people for food and their livelihoods. Reduced level of crop production is also resulting in the malnutrition of women and children.

The results also indicate that, drought also affected the rain fed areas in the district. In rain-fed areas almost every family has livestock as an economic source. The current drought reduced this number to half. This decrease is mainly due to low level of precipitation in the rain-fed areas, which reduces the feed production for livestock and causes substantial losses of livestock.

Government should address drought related issues with proactive approach rather than focusing it with reactive approach. Government and stockholders should provide permanent extension services to facilitate farmers in term of economic growth in the study area.

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